

What is New on the Sun?

A fundamental property of the Sun's corona is that it is violently dynamic. The most spectacular and most energetic manifestations of this activity are the giant magnetic disruptions that give rise to coronal mass ejections (CME) and eruptive flares. These major events are of critical importance, because they drive the most destructive forms of space weather at Earth and in the solar system, and they provide a unique opportunity to study, in revealing detail, the interaction of magnetic field and matter, in particular, magnetohydrodynamic instability and nonequilibrium — processes that are at the heart of laboratory and astrophysical plasma physics. Recent observations by a number of NASA space missions have given us new insights into the physical mechanisms that underlie coronal explosions. Furthermore, massively-parallel computations have now allowed us to calculate fully three-dimensional models for the Sun's activity. In this talk I will review some of the latest observations of the Sun, including those from the just-launched Hinode and STEREO mission, and discuss recent advances in the theory and modeling of explosive solar activity.

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